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IN THE CLAIMS

1. (currently amended) A method for controlling speed in a pulse-width-modulation-controlled motor powered by a load voltage source, said method comprising the steps of:

diagnosing functionality of the motor;

measuring the motor load voltage, wherein said step of measuring the motor load voltage further comprises utilizing at least one switching element to bypass a resistive element; and

setting pulse-width modulation duty cycles based on the measured voltage, wherein an average of frequencies of the pulse-width modulation duty cycles is a predetermined average pulse-width modulation frequency of the motor.

2. (original) A method in accordance with Claim 1 wherein said steps are sequentially executed and repeated automatically while the motor is in an on state.

3. (currently amended) A method for controlling speed in a pulse-width-modulation-controlled motor powered by a load voltage source, said method comprising the steps of:

measuring the motor load voltage, wherein a supply voltage provides the load voltage;

setting pulse-width modulation duty cycles based on the measured voltage, wherein an average of frequencies of the pulse-width modulation duty cycles is a predetermined average pulse-width modulation frequency of the motor; and

diagnosing motor~~a motor~~ functionality using a difference between the supply voltage and the load voltage.~~voltage;~~

4. (canceled)

5. (original) A method in accordance with Claim 3 wherein the supply voltage is unregulated.

6. (original) a method in accordance with Claim 3 wherein the supply voltage is direct current.

7. (previously presented) A method for controlling speed in a pulse-width-modulation-controlled motor powered by a load voltage, the load voltage supplied by a supply voltage, said method comprising the steps of:

diagnosing motor functionality using a difference between the supply voltage and the load voltage;

switching from motor functionality diagnosis to motor speed control; and

setting an average speed of the motor by superimposing sweep frequencies onto an average pulse-width frequency, the average pulse-width frequency being a predetermined average of the sweep frequencies.

8. (original) A method in accordance with Claim 7 wherein said step of diagnosing motor functionality comprises the step of using a pulse width modulation duty cycle of 100 percent.

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9. (original) A method in accordance with Claim 7 wherein said step of diagnosing motor functionality using a difference between the supply voltage and the load voltage comprises calculating power used by the motor in accordance with:

$$\frac{[(Upper\_A/D\_\mathrm{Re}ading)-(Lower\_A/D\_\mathrm{Re}ading)]^2}{Rsense}$$

where $Upper\_A/D\ Reading$ is the supply voltage measurement, $Lower\_A/D\_Reading$ is the load voltage measurement, and $Rsense$ is a resistance between measurement locations for $Upper\_A/D\_Reading$ and $Lower\_A/D\_Reading$.

10. (currently amended) A closed loop motor control system, said system comprising:

a motor;

a power source;

a resistive element electrically coupling said motor to said power source;

at least one switching element electrically coupling said motor to said power source in parallel to said resistive element; and

a processor electrically connected to said switching element, said processor configured to:

diagnose functionality of said motor;

determine a load voltage of said motor; and~~voltage; and~~

set a pulse width modulation duty cycle based on the determined voltage.

11. (original) A closed loop system in accordance with Claim 10 wherein said processor further configured to:

determine the load voltage while the motor is in an on state repeatedly automatically; and

set a pulse width modulation duty cycle based on the determined voltage while the motor is in an on state repeatedly automatically.

12. (canceled)

13. (currently amended) A closed loop system in accordance with <u>Claim 10</u>~~Claim 12~~ wherein said processor further configured to diagnose <u>functionality of said motor by</u>~~motor functionality~~ using a pulse width modulation duty cycle of 100 percent.

14. (currently amended) A closed loop system in accordance with <u>Claim 10</u>~~Claim 12~~ wherein said processor further configured to diagnose <u>functionality of said motor</u>~~motor functionality~~ by calculating power used by the motor in accordance with:

$$\frac{[(Upper\_A/D\_Reading)-(Lower\_A/D\_Reading)]^2}{Rsense}$$

where $Upper\_A/D\_Reading$ is a supply voltage measurement, $Lower\_A/D\_Reading$ is a load voltage measurement, and $Rsense$ is a resistance between measurement locations for $Upper\_A/D\_Reading$ and $Lower\_A/D\_Reading$.

15. (original) A system in accordance with Claim 10 wherein said power source comprises an unregulated voltage supply.

16. (original) A system in accordance with Claim 15 wherein said unregulated voltage supply comprises an unregulated DC voltage supply.

17. (previously presented) A method for operating a motor configured to operate at a variable average speed under pulse-width modulation control, said method comprising the steps of:

energizing the motor; and

setting an average speed by superimposing sweep frequencies onto an average pulse-width modulation frequency, the average pulse-width modulation frequency being a predetermined average of the sweep frequencies.

18. (previously presented) A method in accordance with Claim 17 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform.

19. (previously presented) A method in accordance with Claim 17 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform.

20. (previously presented) A method in accordance with Claim 17 wherein said step of setting an average speed further comprises the step of setting an average speed by

superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency.

21. (previously presented) A method in accordance with Claim 17 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform with a low value approximately 20% below the average and a high value approximately 20% above the average.

22. (previously presented) A method in accordance with Claim 17 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform with a low value approximately 20% below the average and a high value approximately 20% above the average.

23. (previously presented) A method in accordance with Claim 17 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency with a low value approximately 20% below the average and a high value approximately 20% above the average.

24. (previously presented) A method in accordance with Claim 17 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

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25. (previously presented) A method in accordance with Claim 17 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

26. (previously presented) A method in accordance with Claim 17 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

27. (previously presented) A motor comprising:

a housing;

a stator mounted in said housing, said stator comprising a stator bore;

a rotor rotatably mounted at least partially within said stator bore; and

a processor electrically connected to at least one of said stator and said rotor, said processor configured to:

determine a load voltage; and

set an average speed of the motor by superimposing sweep frequencies onto an average pulse-width frequency, the average pulse-width frequency being a predetermined average of the sweep frequencies.

28. (currently amended) A motor in accordance with Claim 27 wherein said processor further configured to diagnose functionality of said motor.~~motor functionality.~~

29. (currently amended) A motor in accordance with Claim 28 wherein said processor further configured to diagnose functionality of said motor~~motor functionality~~ by calculating power use in accordance with:

$$\frac{[(Upper\_A/D\_\mathrm{Re}ading)-(Lower\_A/D\_\mathrm{Re}ading)]^2}{Rsense}$$

where $Upper\_A/D\_Reading$ is a supply voltage measurement, $Lower\_A/D\_Reading$ is a load voltage measurement, and $Rsense$ is a resistance between measurement locations for $Upper\_A/D\_Reading$ and $Lower\_A/D\_Reading$.

30. (previously presented) A motor comprising:

a housing;

a stator mounted in said housing, said stator comprising a stator bore;

a rotor rotatably mounted at least partially within said stator bore; and

a processor electrically connected to at least one of said stator and said rotor, said processor configured to set an average speed by superimposing sweep frequencies onto an average pulse-width modulation frequency, wherein the average pulse-width modulation frequency is a predetermined average of the sweep frequencies.

31. (previously presented) A motor in accordance with Claim 30 wherein said processor further configured to set an average speed by superimposing a sweep frequency range

onto an average pulse-width modulation frequency forming a monotonically increasing waveform.

32. (previously presented) A motor in accordance with Claim 30 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform.

33. (previously presented) A motor in accordance with Claim 30 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency.

34. (previously presented) A motor in accordance with Claim 30 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform with a low value approximately 20% below the average and a high value approximately 20% above the average.

35. (previously presented) A motor in accordance with Claim 30 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform with a low value approximately 20% below the average and a high value approximately 20% above the average.

36. (previously presented) A motor in accordance with Claim 30 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around

the average pulse-width modulation frequency with a low value approximately 20% below the average and a high value approximately 20% above the average.

37. (previously presented) A motor in accordance with Claim 30 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

38. (previously presented) A motor in accordance with Claim 30 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

39. (previously presented) A motor in accordance with Claim 30 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

40. (previously presented) A refrigerator comprising:

a housing;

a freezer section at least partially within said housing;

a fresh food section at least partially within said housing;

a motor at least partially within said housing; and

a processor electrically connected to said motor, said processor configured to set an average speed of the motor by superimposing sweep frequencies onto an average pulse-width modulation frequency, wherein the average pulse-width modulation frequency is a predetermined average of the sweep frequencies.

41. (previously presented) A refrigerator in accordance with Claim 40 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform.

42. (previously presented) A refrigerator in accordance with Claim 40 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform.

43. (previously presented) A refrigerator in accordance with Claim 40 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency.

44. (previously presented) A refrigerator in accordance with Claim 40 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform with a low value approximately 20% below the average and a high value approximately 20% above the average.

45. (previously presented) A refrigerator in accordance with Claim 40 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform with a low value approximately 20% below the average and a high value approximately 20% above the average.

46. (previously presented) A refrigerator in accordance with Claim 40 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency with a low value approximately 20% below the average and a high value approximately 20% above the average.

47. (previously presented) A refrigerator in accordance with Claim 40 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

48. (previously presented) A refrigerator in accordance with Claim 40 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

49. (previously presented) A refrigerator in accordance with Claim 40 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform

centered around the average pulse-width modulation frequency with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

50. (previously presented) A refrigerator comprising:

a housing;

a freezer section at least partially within said housing;

a fresh food section at least partially within said housing;

a motor at least partially within said housing; and

a processor electrically connected to said motor, said processor configured to:

determine a load voltage; and

set an average speed of the motor by superimposing sweep frequencies onto an average pulse width frequency, the average pulse-width frequency being a predetermined average of the sweep frequencies.

51. (currently amended) A refrigerator in accordance with Claim 50 wherein said processor further configured to diagnose functionality of said motor.~~motor functionality.~~

52. (currently amended) A motor in accordance with Claim 51 wherein said processor further configured to diagnose functionality of said motor~~motor functionality~~ by calculating power use in accordance with:

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$$\frac{\underline{[(Upper\_A/D\_Reading)-(Lower\_A/D\_Reading)]^2}}{Rsense}$$

where $Upper\_A/D\_Reading$ is a supply voltage measurement, $Lower\_A/D\_Reading$ is a load voltage measurement, and $Rsense$ is a resistance between measurement locations for $Upper\_A/D\_Reading$ and $\underline{Lower\_A/D\_Reading}$.~~and $Lower\_A/D\_Reading$.~~